

Attachment F

WRESL File Guide to CALSIM II San Joaquin River Water Quality Module

A typical CALSIM II D1641-step main file is listed below. This main file includes WRESL files in the order of how they are called in order to construct the D1641 linear-programming problem for each month. Several WRESL files are highlighted in bold-underline. These files contain decision variable definitions and simulation logic related to WQ Module calculations. Please examine these files for links to related lookup tables and state variable definitions. To assist review, please refer to the new San Joaquin hydrology schematic presented in Figure 2-2 of Attachment B.

To gain familiarity with the module logic, a review might begin with the following files:

- Common\SanJoaquin\WaterQuality\Wq_defs_disag.wresl
- Common\SanJoaquin\WaterQuality\Vernalis_wqmin_disag.wresl
- Common\SanJoaquin\WaterQuality\Vernalis_wqpulse_disag.wresl
- Common\SanJoaquin\Various\Bounds_Cycles\Cycle6\WQ_Bound_disag.wresl

The first file features many of the variable definitions and lookup table references related to water quality calculations. The latter three files feature mass balance calculations along the mainstem San Joaquin River between Lander Avenue and Vernalis.

```
MODEL SJRBASE {      !CYCLE 1

  INCLUDE '..\..\common\wytypes\wytypes.wresl'
  INCLUDE '..\..\common\sanjoaquin\Various\definitions\SJR_GWPPumpingSplits.wresl'
  INCLUDE '..\..\common\System\System_SJR.wresl'
    • ..\SystemTables_SJR\return-table.wresl
    • ..\SystemTables_SJR\inflow-table.wresl
    • ..\SystemTables_SJR\delivery-table.wresl
    • ..\SystemTables_SJR\connectivity-table.wresl

  INCLUDE '..\..\common\hydrology\forecast\forecast.wresl'
  INCLUDE '..\..\common\cvp_dellogic\cvp_dellogic_sys\cvp_dellogic_sys_cycle1.wresl'
  INCLUDE '..\..\common\cvp_dellogic\cvp_dellogic_s\cvp_dellogic_s_cycle1.wresl'

  INCLUDE '..\..\common\sanjoaquin\Various\definitions\SJR_ChannelSplits.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Various\SetWSReturns\SetWSRetcycle1thru5.wresl'

  INCLUDE '..\..\common\sanjoaquin\Various\definitions\SJR_aggreg.wresl'
  INCLUDE '..\..\common\sanjoaquin\Various\definitions\previous_wyt_SJR.wresl'
  INCLUDE '..\..\common\sanjoaquin\Various\definitions\SJR_DeliverySplits.wresl'
  INCLUDE '..\..\common\sanjoaquin\Various\definitions\SJR_restrict.wresl'

  INCLUDE '..\..\common\sanjoaquin\Friant\friant.wresl'
  INCLUDE '..\..\common\sanjoaquin\SouthernSJR\SouthernSJR_dems.wresl'
  INCLUDE '..\..\common\sanjoaquin\SouthernSJR\BypassLoss.wresl'
  INCLUDE '..\..\common\sanjoaquin\Merced\Merced_Dems.wresl'
  INCLUDE '..\..\common\sanjoaquin\Tuolumne\Tuolumne_Dems.wresl'
  INCLUDE '..\..\common\sanjoaquin\Stanislaus\NewMelonesForecast.wresl'
  INCLUDE '..\..\common\sanjoaquin\Stanislaus\Stan_defs.wresl'
```

```

INCLUDE '..\..\common\sanjoaquin\Stanislaus\Stanislaus_Dems.wresl'
INCLUDE '..\..\common\sanjoaquin\Mainstem\MainstemSJR_Dems.wresl'
INCLUDE '..\..\common\sanjoaquin\Calaveras\Calaveras_Dems.wresl'
INCLUDE '..\..\common\sanjoaquin\Mokulumne\deliver_mok.wresl'

INCLUDE '..\..\common\sanjoaquin\ReturnFlows\WestSide_RF_Defs.wresl'
INCLUDE '..\..\common\sanjoaquin\ReturnFlows\WestSideReturns.wresl'

INCLUDE '..\..\common\sanjoaquin\WaterQuality\wq_defs_Disag.wresl'

INCLUDE[local] '..\..\common\sanjoaquin\Stanislaus\stan_FW_min.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\Tuolumne\tuol_FERC_min.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle1.wresl'

INCLUDE '..\..\common\System\SystemTables_SJR\weight-table.wresl'
INCLUDE '..\..\common\sanjoaquin\WaterQuality\disaggregation\Disag_Def.wresl'

- .\Accretion\Accretion_Def.wresl
- .\WestsideReturns\WS>Returns_Def.wresl
- .\NP_Diversion\NPD_Flow.wresl
- .\NP_Return\NPR_Flow.wresl
- .\NP_Return\NPR_EC.wresl


}

MODEL SJR_WQ1 { !CYCLE 2
  INCLUDE[local] '..\..\common\sanjoaquin\various\SetWSReturns\SetWSRetcycle1thru5.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC1.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\Vernalis_WQmin_Disag.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle2.wresl'
}

MODEL SJR_PULSE { !CYCLE 3
  INCLUDE[local] '..\..\common\sanjoaquin\various\SetWSReturns\SetWSRetcycle1thru5.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Stanislaus\stan_FW_pulse.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Tuolumne\tuol_FERC_pulse.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle3.wresl'
}

MODEL SJR_WQ2 { !CYCLE 4
  INCLUDE[local] '..\..\common\sanjoaquin\various\SetWSReturns\SetWSRetcycle1thru5.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC3.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\Vernalis_WQpulse_Disag.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle4.wresl'
}

MODEL VAMP_AND_DO { !CYCLE 5
  INCLUDE[local] '..\..\common\sanjoaquin\various\SetWSReturns\SetWSRetcycle1thru5.wresl'
  INCLUDE[local] '..\..\common\SANJOAQUIN\VAMP\VAMP_REQ.WRESL'
  INCLUDE[local] '..\..\common\SANJOAQUIN\VAMP\VAMP_ALLOC.WRESL'
  INCLUDE[local] '..\..\common\SANJOAQUIN\STANISLAUS\DO.WRESL'
  INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'
  INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle5.wresl'
}

MODEL MONTHLYWEIGHTED { !CYCLE 6
  INCLUDE[local] '..\..\common\System\System_ALL.wresl'
  INCLUDE '..\..\common\delta\DeltaExtFuncs.wresl'
  INCLUDE[LOCAL] '..\..\common\hydrology\hydrology.wresl'
  INCLUDE[LOCAL] '..\..\common\NorthOfDelta\nod.wresl'

```

```

INCLUDE[LOCAL] '\Nodminflows\setnodminflows.wresl'
INCLUDE[LOCAL] 'export_ops\BanksSplit.wresl'
INCLUDE[LOCAL] '..\..\common\export_ops\export_ops.wresl'
INCLUDE[LOCAL] 'export_ops\Banks_pump_allow.wresl'
INCLUDE[LOCAL] 'export_ops\exportratio.wresl'
INCLUDE[LOCAL] 'export_ops\april_may_maxexport.wresl'
INCLUDE[LOCAL] 'Delta\MRDO\X2\x2req.wresl'
INCLUDE[LOCAL] '..\..\common\swp_dellogic\swp_dellogic.wresl'
INCLUDE[LOCAL] '..\..\common\cvp_dellogic\cvp_dellogic_sys\cvp_dellogic_sys_cycle6.wresl'
INCLUDE[LOCAL] '..\..\common\cvp_dellogic\cvp_dellogic_s\cvp_dellogic_s_cycle6.wresl'
INCLUDE[LOCAL] '..\..\common\rulecurve\rulecv.wresl'
INCLUDE[LOCAL] 'wheeling\wheelzero.wresl'
INCLUDE[LOCAL] '..\..\common\coa\coa.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\VAMP\VAMP_transfer.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\vernal\MercedRelease_Oct.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\vernal\vernal_min.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\PurchasedWater\InstreamFromOID.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC2.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC5.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle6_Disag.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\various\cycleout\writecycle.wresl'
INCLUDE [LOCAL] '..\..\common\Delta\Delta_ANN.wresl' /* ...Gmodel must be OFF if this is ON */
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ANN_data.wresl' /* ... Gmodel must be OFF if this is ON */
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ExportEstimate.wresl' /* ... Gmodel must be OFF ... */
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ANN_constraints.wresl' /* ... Gmodel must be OFF ... */
INCLUDE [LOCAL] '..\..\common\Delta\mrdo\mrdo_ANN.wresl' /* ... Gmodel must be OFF if this is ON */
INCLUDE [LOCAL] '..\..\common\Delta\mrdo\Salinity\Gmodel\ANN-Gmodel.wresl' /*...Gmodel...OFF ...*/

INCLUDE[local] '..\..\common\shortage\shortage.wresl'
INCLUDE[local] 'System\SystemTables_ALL\weight-table.wresl'
INCLUDE[local] '..\..\common\swpcvpdeloutput.wresl'
}

```

MODEL CVCWHEELING { !CYCLE 7

```

INCLUDE[local] '..\..\common\System\System_ALL.wresl'
INCLUDE[LOCAL] '..\..\common\hydrology\hydrology.wresl'
INCLUDE[LOCAL] '..\..\common\NorthOfDelta\nod.wresl'
INCLUDE[LOCAL] '\Nodminflows\setnodminflows.wresl'
INCLUDE[LOCAL] 'export_ops\BanksSplit.wresl'
INCLUDE[LOCAL] '..\..\common\export_ops\export_ops.wresl'
INCLUDE[LOCAL] 'export_ops\Banks_pump_allow.wresl'
INCLUDE[LOCAL] 'export_ops\exportratio.wresl'
INCLUDE[LOCAL] 'export_ops\april_may_maxexport.wresl'
INCLUDE[LOCAL] 'Delta\MRDO\X2\x2req.wresl'
INCLUDE[LOCAL] '..\..\common\swp_dellogic\swp_dellogic.wresl'
INCLUDE[LOCAL] '..\..\common\cvp_dellogic\cvp_dellogic_sys\cvp_dellogic_sys_cycle6.wresl'
INCLUDE[LOCAL] '..\..\common\cvp_dellogic\cvp_dellogic_s\cvp_dellogic_s_cycle6.wresl'
INCLUDE[LOCAL] '..\..\common\rulecurve\rulecv.wresl'
INCLUDE[LOCAL] 'wheeling\wheelcap.wresl'
INCLUDE[LOCAL] 'wheeling\wheelfixes.wresl'
INCLUDE[LOCAL] '..\..\common\coa\coa.wresl'
INCLUDE[LOCAL] '..\..\common\wsi_di_gen\wsi_di_gen.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\VAMP\VAMP_transfer.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\vernal\MercedRelease_Oct.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\vernal\vernal_min.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\PurchasedWater\InstreamFromOID.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\Groundwater\SJRGW_restrict.wresl'

```

```

INCLUDE[local]
'..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC2.wresl'
INCLUDE[local]
'..\..\common\sanjoaquin\WaterQuality\disaggregation\WestsideReturns\WSReturnC5.wresl'
INCLUDE[local] '..\..\common\sanjoaquin\various\bounds_cycles\bounds_cycle6_Disag.wresl'

```

```
INCLUDE[local] '..\..\common\sanjoaquin\various\cycleout\writecycle.wresl'
```

```
INCLUDE[local] '..\..\common\sanjoaquin\WaterQuality\disaggregation\Disag_WriteOut.wresl'
```

```
INCLUDE [LOCAL] '..\..\common\Delta\Delta_ANN.wresl' /* ... Gmodel must be OFF ... */  
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ANN_datafix.wresl' /* ... Gmodel must be OFF ... */  
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ExportEstimate.wresl' /* ... Gmodel must be OFF ... */  
INCLUDE [LOCAL] '..\..\common\Delta\ANN\ANN_constraints.wresl' /* ... Gmodel must be OFF ... */  
INCLUDE [LOCAL] '..\..\common\Delta\mrdo\mrdo_ANN.wresl' /* ... Gmodel must be OFF ... */  
INCLUDE [LOCAL] '..\..\common\Delta\mrdo\Salinity\Gmodel\ANN-Gmodel.wresl' /*...Gmodel...OFF...*/
```

```
INCLUDE[local] '..\..\common\shortage\shortage.wresl'  
INCLUDE[local] 'System\SystemTables_ALL\weight-table.wresl'  
INCLUDE[local] '..\..\common\swpcvpdeloutput.wresl'
```

```
define D419_swpC6 {alias D419_swp[MONTHLYWEIGHTED] units 'cfs'}
```

```
INCLUDE[LOCAL] '..\..\common\DailyDeltaInput\DailyDeltaInput.wresl'
```

```
}
```